

REMARKS

These amendment and remarks are filed in response to the rejection mailed November 1, 2006. For the following reasons, this application should be allowed and the application passed to issue. No new matter is introduced by this amendment. The amendment to claim 1 is supported by Fig. 3 and the accompanying written description, which clearly teaches that the undoped contact layer does not include Al. Claim 12 is amended to correct an informality. New claim 27 is supported by claim 1 and throughout the specification, including page 8, line 24 to page 9, line 2. Support for new claims 28 and 29 is found in originally filed claims 2 and 6, respectively. New claims 27-29 are readable on elected Species IV.

Claims 1-4, 6-10, 12, and 14-29 are pending in this application. Claims 8, 10, 17-22, 24, and 25 were withdrawn pursuant to a restriction requirement. Claims 1-4, 6, 7, 9, 12, 14-16, 23, and 26 have been rejected. Claims 1 and 12 have been amended in this paper. Claims 5, 11, and 13 were previously canceled. New claims 27-29 are added.

Restriction Requirement

Upon the allowance of the claims directed to the elected species, Applicants respectfully request rejoinder, examination, and allowance of the withdrawn species.

Claim Rejections Under 35 U.S.C. § 112

Claim 12 was rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. This rejection is traversed, and reconsideration and withdrawal thereof respectfully requested.

Claim 12 has been amended to correct the asserted informality. Applicants submit that the claims fully comport with the requirements of 35 U.S.C. § 112.

Claim Rejections Under 35 U.S.C. § 103

Claims 1-4, 6, 15, 16, 23, and 26 were rejected under 35 U.S.C. § 103 (a) as being unpatentable over Okumura (U.S. Pat. Pub. No. 2005/0211971) in view of Sasanuma (JP 2000-101142). This rejection is traversed, and reconsideration and withdrawal thereof respectfully requested. The following is comparison between the invention as claimed and the cited prior art.

An aspect of the invention, per claim 1, is a nitride-based semiconductor light-emitting device comprising a first conductivity type first nitride-based semiconductor layer formed on a substrate. An active layer is formed on the first nitride-based semiconductor layer. A first undoped optical guide layer is formed on the active layer. A second conductivity type second nitride-based semiconductor layer having a single layer structure with a thickness of at least 0.1 μm is formed on the first undoped optical guide layer. An undoped contact layer is formed directly on the second nitride-based semiconductor layer without another second conductivity type layer having a thickness of less than 0.1 μm intervening therebetween. An electrode is formed directly on the undoped contact layer. The undoped contact layer has a thickness of at least about 1 nm and not more than about 10 nm, and the undoped contact layer does not include Al.

Another aspect of the invention, per claim 26 is a nitride-based semiconductor light-emitting device comprising a first conductivity type first nitride-based semiconductor layer formed on a substrate. An active layer is formed on the first nitride-based semiconductor layer. A second conductivity type second nitride-based semiconductor layer having a single layer structure with a thickness of at least 0.1 μm is formed on the active layer. An undoped contact layer is formed directly on the second nitride-based semiconductor layer without another second conductivity layer having a thickness less than 0.1 μm intervening therebetween. An electrode is

formed directly on the undoped contact layer. The undoped contact layer has a thickness of at least about 1 nm and not more than about 10 nm.

Okumura and Sasanuma, whether taken alone, or in combination, do not suggest the claimed nitride-based semiconductor light-emitting device comprising an undoped contact layer formed directly on the second nitride-based semiconductor layer without another second conductivity type layer having a thickness of less than 0.1 μm intervening therebetween, the undoped contact layer having a thickness of at least about 1 nm and not more than about 10 nm, and the undoped contact layer does not include Al, as required by claim 1. Further, Okumura and Sasanuma do not suggest the nitride-based semiconductor device, as required by claim 26, wherein a second conductivity type second nitride-based semiconductor layer having a single layer structure with a thickness of at least 0.1 μm is formed on the first undoped optical guide layer, an undoped contact layer is formed directly on the second nitride-based semiconductor layer without another second conductivity layer having a thickness less than 0.1 μm intervening therebetween, and the undoped contact layer has a thickness of at least about 1 nm and not more than about 10 nm.

In accordance with the claimed inventions, even when an undoped contact layer is employed, excellent contact is obtained between the undoped contact layer and the electrode. As shown in Fig. 3 and the accompanying written description of the present specification, a contact resistance is large in the case of an undoped contact layer consisting of AlGa_xN_{1-x}, which includes Al. The contact resistance values of undoped InGa_xN_{1-x} and GaN are much closer to the contact value of p-type GaN having a film thickness of 1 to 10 nm. Okumura and Sasanuma, on the other hand, disclose a p-GaN contact layer 10 doped with Mg and a contact layer 11 having a superlattice structure consisting of AlGa_xN_{1-x} and GaN, respectively. In both Okumura and

Sasanuma contact layers containing Al are used. Thus, there is no motivation to modify Okumura to comprise an undoped contact layer not including Al.

Based upon the foregoing it should be apparent that even if the applied references are combined as proposed by the Examiner, and Applicants do not agree that the requisite fact-based motivation has been established, the claimed invention would not result. *Uniroyal, Inc. v. Rudkin-Wiley Corp.*, *supra*. Moreover, Applicants submit that the requisite fact-based realistic motivation has not been established.

Claims 7, 9, and 14 were rejected under 35 U.S.C. § 103 (a) as being unpatentable over Okumura and Sasanuma in view of Sugiura et al. (JP 10-215034). This rejection is traversed, and reconsideration and withdrawal thereof respectfully requested.

The combination of Sugiura et al. with Okumura and Sasanuma does not suggest the claimed nitride-based semiconductor light-emitting device because Sugiura et al. do not cure the deficiencies of Okumura and Sasanuma. Sugiura et al. do not suggest the claimed nitride-based semiconductor light-emitting device comprising an undoped contact layer formed directly on the second nitride-based semiconductor layer without another second conductivity type layer having a thickness of less than 0.1 μm intervening therebetween, the undoped contact layer having a thickness of at least about 1 nm and not more than about 10 nm, and the undoped contact layer does not include Al, as required by claim 1. Further, Sugiura et al. do not suggest the nitride-based semiconductor device, as required by claim 26, wherein a second conductivity type second nitride-based semiconductor layer having a single layer structure with a thickness of at least 0.1 μm is formed on the first undoped optical guide layer, an undoped contact layer is formed directly on the second nitride-based semiconductor layer without another second conductivity layer having a thickness less than 0.1 μm intervening therebetween, and the undoped contact

layer has a thickness of at least about 1 nm and not more than about 10 nm, as required by claim 26.

The dependent claims are allowable for at least the same reasons as independent claim 1 and further distinguish the claimed nitride-based semiconductor light-emitting device.

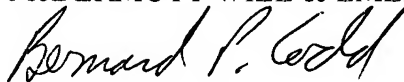
Applicants submit that new claims 27-29 are allowable over the cited references. The contact layer of Okumura's device has a superlattice structure by incorporating a contact layer of Sasanuma having a superlattice structure into Okumura's device. Thus, the contact layer of the Okumura and Sasanuma device is not an undoped contact layer having a single-layer structure, as required by new claim 27.

In view of the above remarks, Applicants submit that this application should be allowed and the case passed to issue. If there are any questions regarding this Response or the application in general, a telephone call to the undersigned would be appreciated to expedite the prosecution of the application.

To the extent necessary, a petition for an extension of time under 37 C.F.R. § 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

McDERMOTT WILL & EMERY LLP



Bernard P. Codd

Registration No. 46,429

Please recognize our Customer No. 20277
as our correspondence address.

600 13th Street, N.W.
Washington, DC 20005-3096
Phone: 202.756.8000 BPC:MWE
Facsimile: 202.756.8087
Date: February 28, 2007